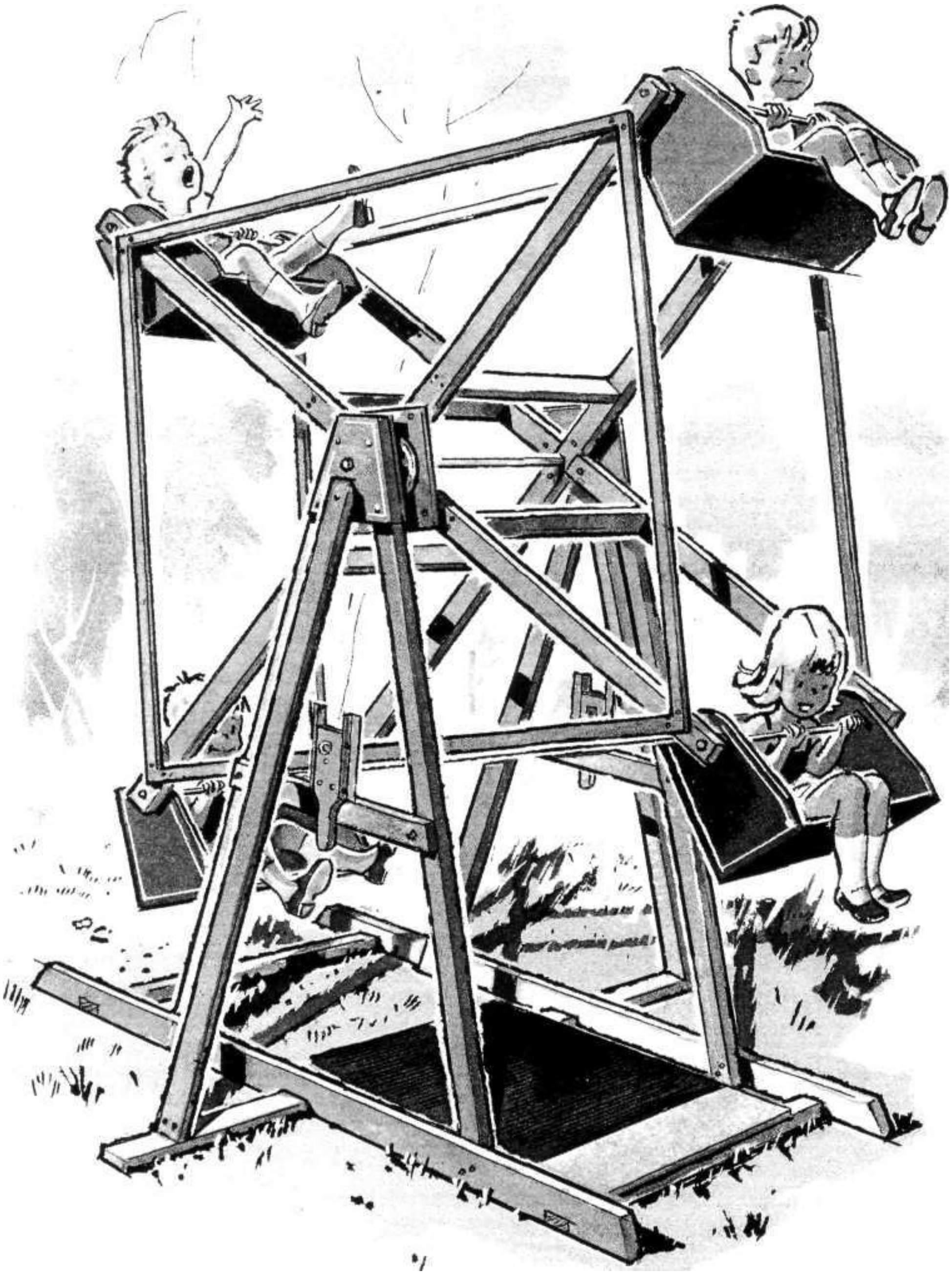


Kid-powered "squaris" wheel

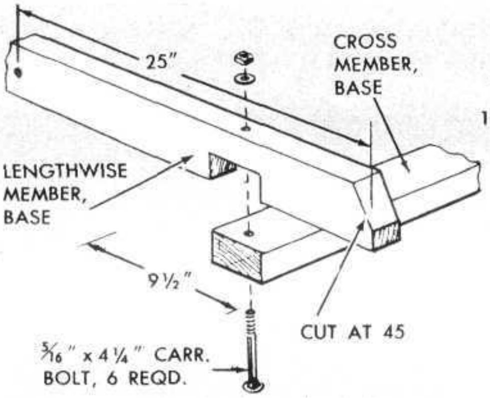
DESIGNED By ROBERT WOOLSON

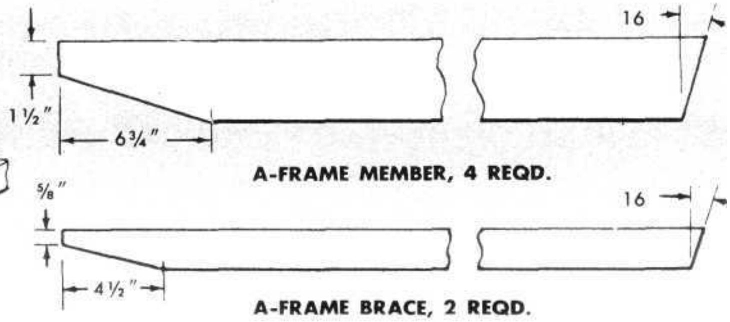
PREPARED By W. CLYDE LAMMEY

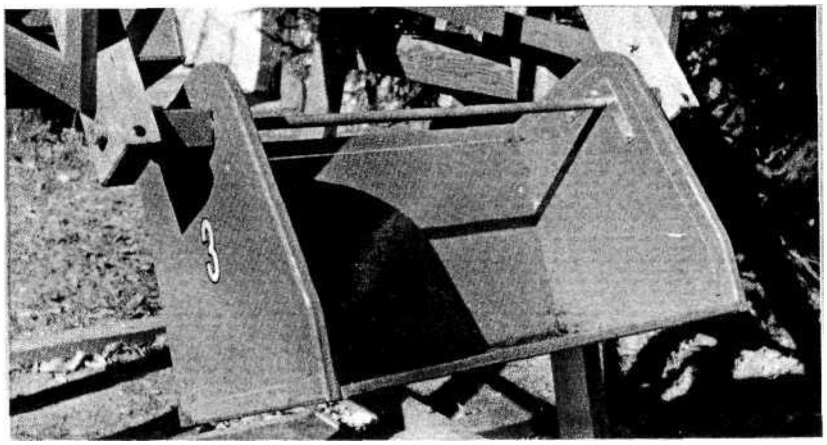
If you'd like to start a carnival in your own yard, here's an unusual ride that can be fun for up to eight tots

DUBBED A "SQUARIS WHEEL" by its designer because of its square wheel, this pint-sized backyard version of its big brother, the ferris wheel, will bring safe carnival fun right to your own home.

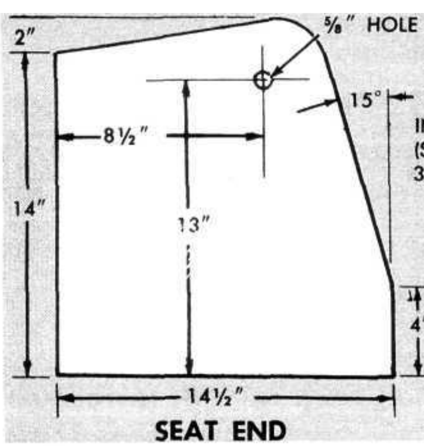
Braced to make it as sturdy as possible, the wheel is designed to operate on "kid power." That is, each time around, each passenger gives the wheel a backward push with his feet. There

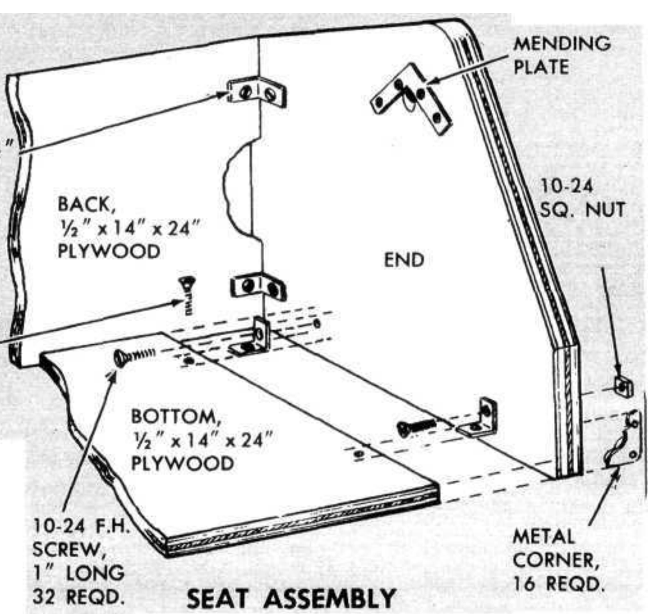






The shafts on which the balanced bucket seats pivot also serve as safety bars. The mending plates on the side panels save wear at the shaft holes

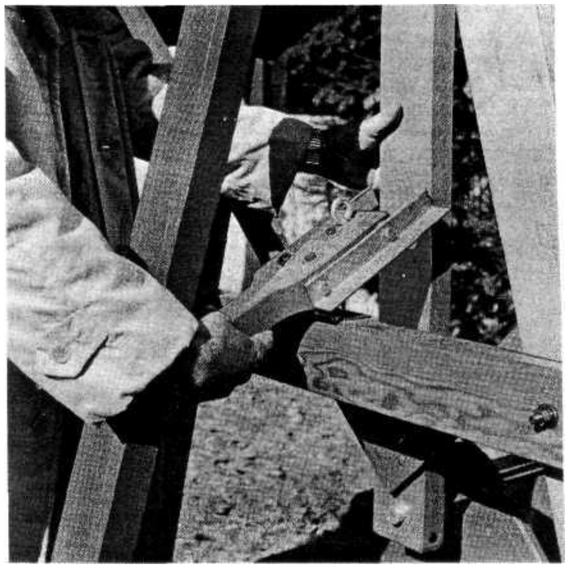




is no danger of traveling too fast for safety, and no danger of falling out of the bucket seats, since the small riders are held in by a safety bar.

Another safety feature is a set of wheel locks, which prevent the toy from being used when mom or dad can't be around to supervise getting on and getting off.

As a first step in construction, carefully look over the pull-apart drawing on page 968. Note that many of the individual assemblies are detailed in the drawing on page 969. If you follow these details with care, the assembly will not be difficult. One word of caution: The base, the A-frames and the wheel spider are made of 2 x 4s. It is very important that you obtain clear, straight stock for these parts. There must be no knots, no weakening blemishes and no crooked pieces, as otherwise you may have trouble building and operating the wheel.



Pivoted wheel locks are provided as a safeguard to prevent use when no adults are present

wheel must run true

The wheel must run true after assembly, and A-frames must stand plumb with the base leveled. The stand, which consists of the base and A-frame, must be set up and leveled on a solid foundation, made either by pouring a couple of narrow concrete slabs on a tamped-gravel fill or two rows of concrete blocks placed on a tamped gravel fill. Then you level the structure by shimming up the low corners. Wooden shingles are just the thing for shimming. Although standard 2 x 4s are held to quite close sectional sizes, you may occasionally find some variations in widths and thicknesses. Usually it's a good idea to check before cutting stock as any appreciable variation might affect some of the dimensions given.

no glue in assembly

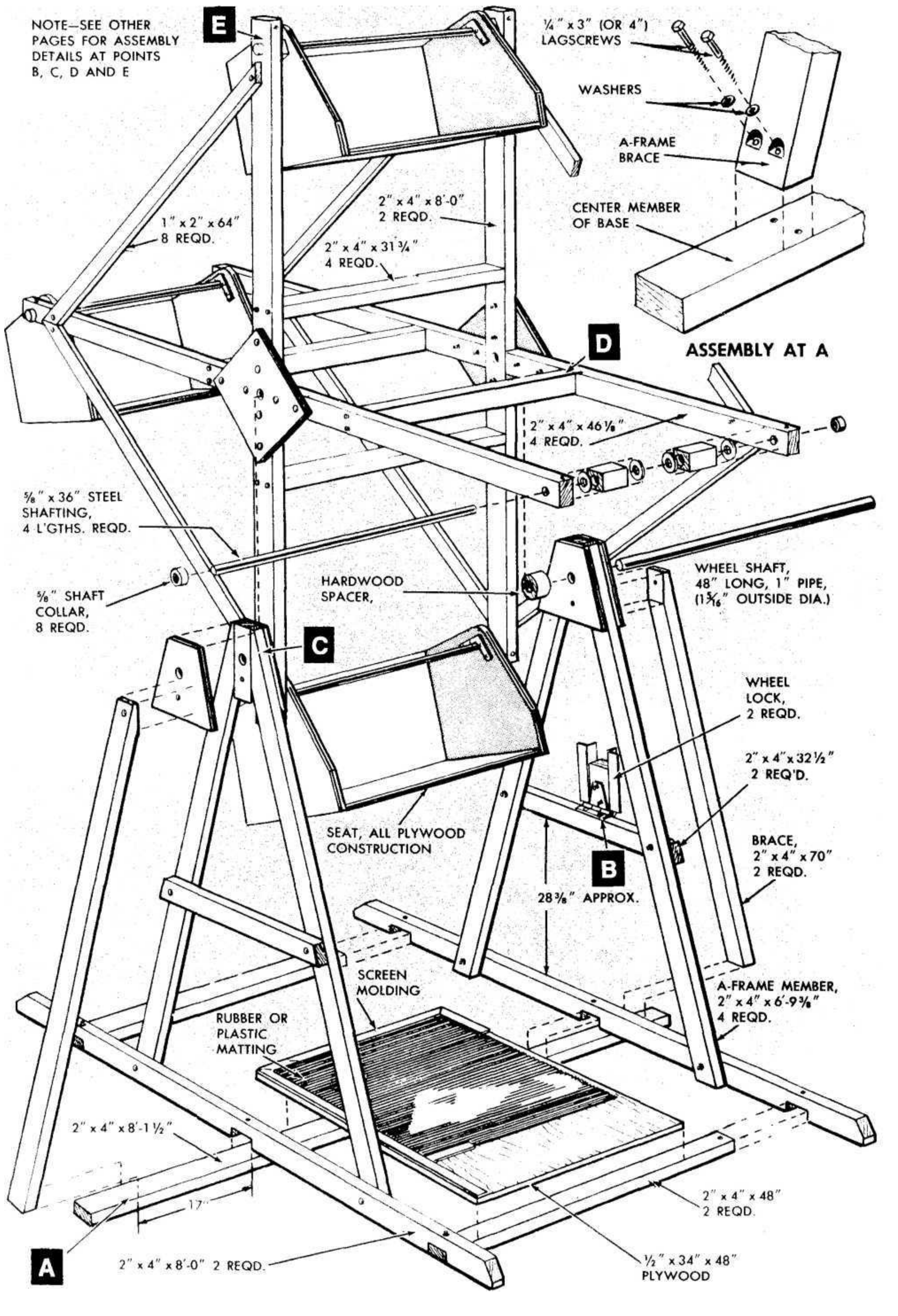
After you have a proper foundation, make the base, which consists of two lengthwise members and three cross members, the latter mortised the full thickness into the lengthwise members and joined with bolts. No glue is used in the entire assembly; only bolts and lagscrews. Next, you make the A-frames, joining at the top ends first as shown in one of the pulled-apart assemblies on page 969. When cutting the top ends of the A-frame members, or legs, lay out according to the detail and saw outside the line in the waste. This permits planing the cut surface to a smooth fit against the filler.

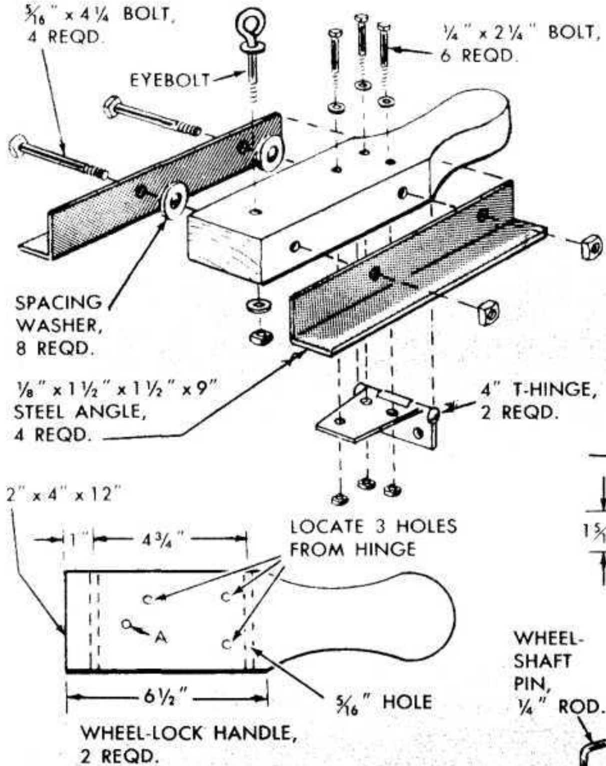
The hole pattern on the inside and outside plywood gussets is identical except for the upper 1/4i-in. hole in each outside gusset. This hole takes the bent end of the pin, the lower end of which passes through a cross hole drilled near each end of the wheel shaft, preventing the latter from turning or working out of place. The shaft holes in both inside and outside gussets should be carefully located, but location of the bolt holes is not critical; just locate them uniform distances from the edges.

To assure register of all bolt and shaft holes, drill the shaft holes first through both gussets and the filler piece, then insert the shaft, clamp the parts together and drill through all three thicknesses. Remember to check beforehand the diameter of the pipe which is used as a wheel shaft.

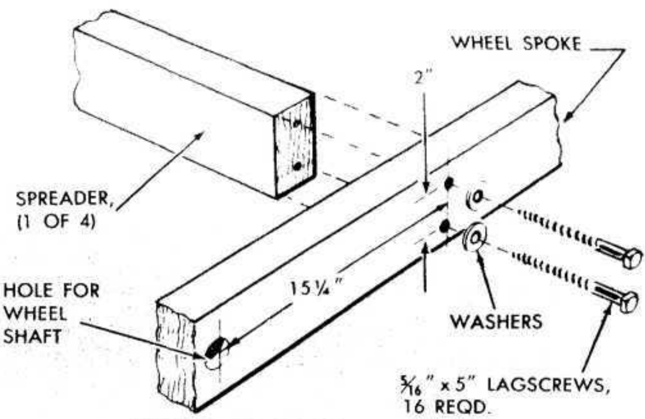
With the top ends of the A-frames joined, bolt the legs to the base, plumb with a level and brace temporarily until you can install the permanent braces. The lower ends of the latter are joined to the center cross member of the base with lag-screws, the washered heads seating in pockets cut into the wide face of the brace with a chisel and gouge as indicated in the assembly view, A. The carriage-bolt heads at the top ends of the braces are seated in shallow counterbores, the large diameter of the latter being slightly larger than the bolt head. Tighten the bolts before releasing the temporary braces. Then check again for plumb.

Next, make the wheel spiders, noting that in the pulled-apart view on page 969 each consists

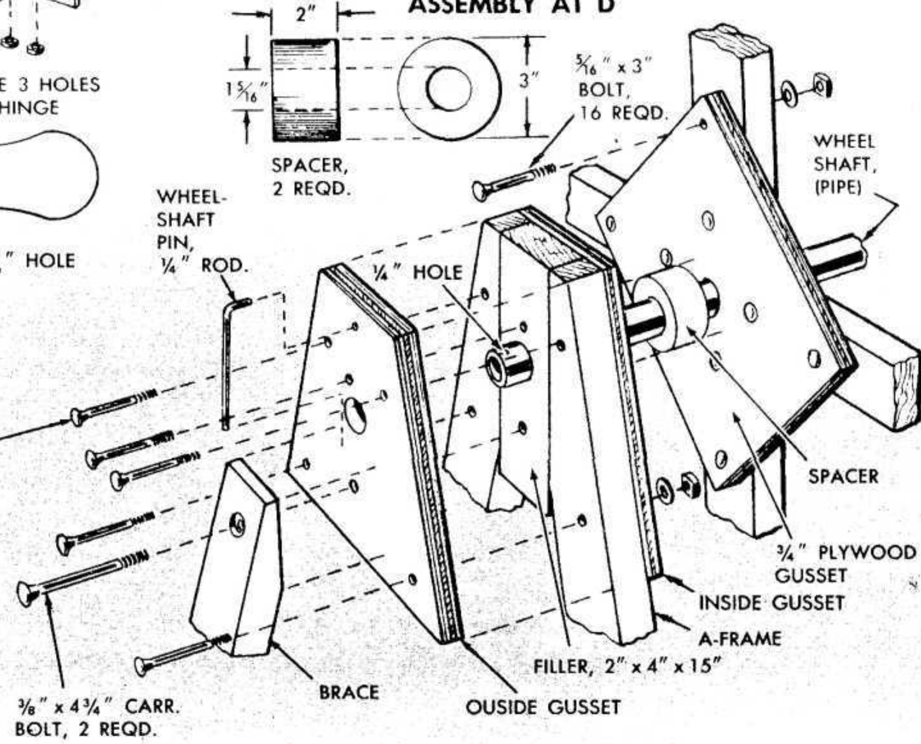

NOTE—SEE OTHER PAGES FOR ASSEMBLY DETAILS AT POINTS B, C, D AND E
E
¼" x 3" (OR 4") LAGSCREWS
WASHERS
A-FRAME BRACE
CENTER MEMBER OF BASE
ASSEMBLY AT A
2" x 4" x 8'-0" 2 REQD.
1" x 2" x 64" 8 REQD.
2" x 4" x 31¾" 4 REQD.
D
2" x 4" x 46⅛" 4 REQD.
⅝" x 36" STEEL SHAFTING, 4 L'GTHS. REQD.
⅝" SHAFT COLLAR, 8 REQD.
HARDWOOD SPACER,
WHEEL SHAFT, 48" LONG, 1" PIPE, (1$\frac{5}{16}$" OUTSIDE DIA.)
C
WHEEL LOCK, 2 REQD.
2" x 4" x 32½" 2 REQ'D.
SEAT, ALL PLYWOOD CONSTRUCTION
B
BRACE, 2" x 4" x 70" 2 REQD.
28⅜" APPROX.
SCREEN MOLDING
RUBBER OR PLASTIC MATTING
A-FRAME MEMBER, 2" x 4" x 6'-9⅜" 4 REQD.
2" x 4" x 8'-1½"
17"
2" x 4" x 48" 2 REQD.
A
2" x 4" x 8'-0" 2 REQD.
½" x 34" x 48" PLYWOOD



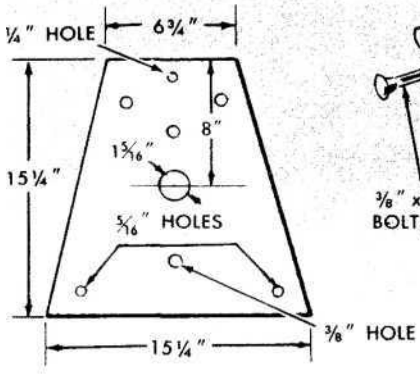
ASSEMBLY AT B



ASSEMBLY AT D

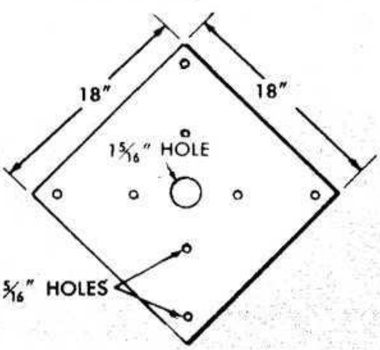


ASSEMBLY AT C

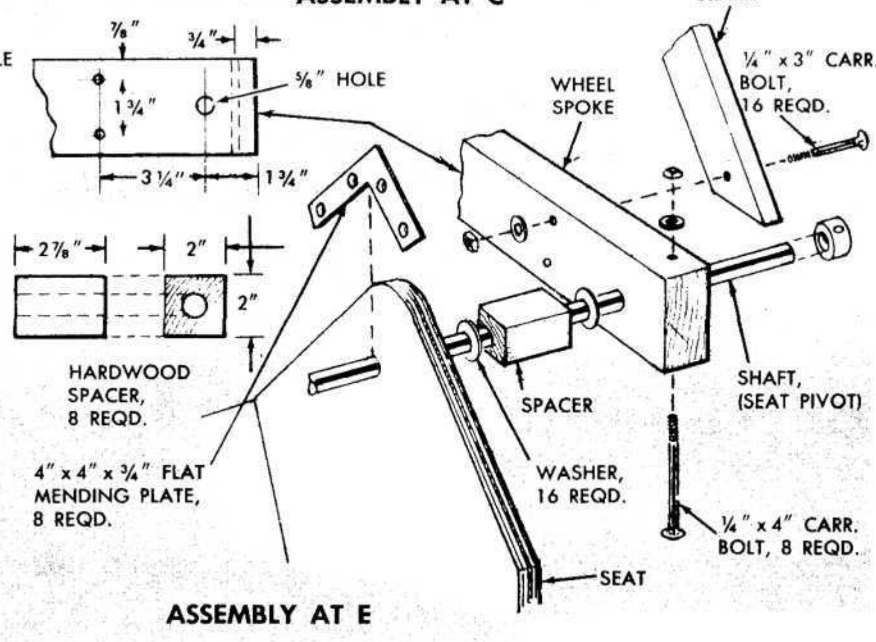


OUTSIDE GUSSET, A-FRAME, 3/4" PLYWOOD

INSIDE GUSSET SAME SIZE EXCEPT 1/2" PLYWOOD. 2 REQD. OF EACH



WHEEL GUSSET, 3/4" PLYWOOD, 2 REQD.



ASSEMBLY AT E

of three members joined at the center to a plywood gusset, making four equally spaced spokes of equal length. Note also that there is a spacer between each wheel gusset and the inside gusset at the top end of each A-frame. These spacers can be band-sawed round as detailed or they can be squares center-drilled to a free fit on the wheel shaft.

Assemble the wheel spiders on the shaft with the spacers in position, making sure that both turn freely. Then locate and drill the holes for the lagscrews which hold the four spreaders as in the detail, D. It's important to cut the ends of the spreaders square and all pieces to exact length. Drill a 1/4-in. hole edgewise near the end of each spoke, insert and tighten a carriage bolt in each of the holes to prevent the spoke ends from splitting. Then drill the 5/8-in. holes in the spokes for the shafts on which the seats pivot. The 1 x 2 wheel-spider braces are installed later.

Assembly of the seats, sizes of the parts and the method of pivoting each seat are shown in detail. Cut four bottoms and four backs to the sizes given from 1/2-in. plywood, then eight end pieces from 3/4-in. plywood to the size given. Smooth all cut edges with sandpaper and then round them slightly. Be sure there are no slivers. Then note that the backs and bottoms are butt-joined to the ends with steel inside "corner irons" as they are often referred to, nine corners being required for each seat. The ninth corner is attached to the bottom and back at the center of the seat. Precise spacing of the corners at the ends is not important; just equalize the spacing.

steel plate bearings

The method of pivoting the seats is shown in the assembly, E. Spacers and two washers are placed between the ends of the seat and the wheel spokes as indicated. The shaft on which each seat pivots is held in place by shaft collars, one at each end. A steel mending plate is placed over the shaft at each end of the seat as shown. These plates serve as metal-to-metal bearings and when screwed in place they also prevent any possibility of the plywood end piece splitting. In one seat detail metal corners of the type used on suitcases and machinist's tool boxes are suggested. These are essentially ornamental and can be attached to all four corners of each seat, to the two back corners only or may be omitted entirely if desired. At this stage the wheel braces, of 1 x 2 stock, and the platform of plywood covered partially with corrugated rubber or plastic matting can be installed.

To finish the job you need two wheel locks, one on each A-frame and attached to the A-frame cross member. One of the two units is shown in the assembly, B. The units are duplicates with one exception which is the installation of an eyebolt in one or the other of the locks. The eyebolt permits locking one unit in the down position with a conventional bike lock, thus preventing the wheel from turning.

The hole for the eyebolt is drilled in one handle in approximately the position shown at A in the assembly, **B.**

use outdoor plywood

As the wheel will be exposed to weathering all plywood parts should be of the grade known as "outdoor plywood." Plywood parts should have the exposed edges filled with wood putty or other suitable filler and should be primed and painted in the color of your choice. On the original wheel plywood parts and the 1 x 2 wheel braces were painted a bright red with gold striping. All other parts were coated with a sealer and finished in the natural color with spar varnish.

When operating the wheel in your yard, it is likely that you will have riders of varying ages and weights, and probably plenty of them. Because of this, you will have to balance the wheel so that it will rotate easily. To do this, purchase some heavy weights—5-lb. lead weights, ingots of the type used by plumbers, or old window sash weights—and keep them handy.

To load the squaris wheel, release the wheel locks and hold the wheel steady. Admit two riders to the lowest car, remembering to instruct the riders to duck their heads under the shaft on which the seat is pivoted and which serves as a safety bar. Now swing the wheel a quarter turn and admit two more riders.

Continue the procedure until the wheel is loaded and ready to run.

Now remove your hands and let the wheel roll on its own for a minute. You will be able to tell which seat is the heaviest because it will swing to the bottom. When that happens, balance the wheel by putting one or more heavy weights on the seat opposite the heavy one. Fasten the weights securely so that they cannot fall from the seat during the ride and injure the tiny passenger in the opposite car.